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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/849,257	05/20/2004	Hiroshi Shibata	L8612.04121	7424
24257	7590	12/28/2005	EXAMINER	
STEVENS DAVIS MILLER & MOSHER, LLP 1615 L STREET, NW SUITE 850 WASHINGTON, DC 20036			STEIN, JAMES D	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/849,257	<b>Applicant(s)</b> SHIBATA ET AL.	
	<b>Examiner</b> James D. Stein	<b>Art Unit</b> 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 15-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-11, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 6 and 11-13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0704, 1104</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This Office Action is responsive to the election with traverse of claims 1-14 and 18-19 (group I) filed on 11/14/05, which is acknowledged. The traversal is on the ground(s) that examination of both groups of claims would not be burdensome to the examiner. This is not found persuasive because examination of all pending claims would require comprehensive searches in completely different classifications, burdening the examiner.

The requirement is still deemed proper and is therefore made FINAL. Therefore, claims 15-17 (group II) are withdrawn at this time for examination purposes, and an action on the merits of claims 1-14 and 18-19 follows.

#### ***Information Disclosure Statement***

The prior art documents submitted in the Information Disclosure Statements filed on 07/30/04 and 11/23/04 have all been considered and made of record (note attached corresponding PTO-1449). Also, the International Search Report and Written Opinion of the corresponding International Application (PCT/JP04/007209) has been considered.

#### ***Drawings***

Nineteen (19) pages of formal drawings filed on 5/20/04 have been accepted by the examiner.

#### ***Specification***

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

Claims 1, 3 and 10 are objected to because of the following informalities:

Claim 1 is unclear with respect to the limitation “a reflection layer film provided in the piezoelectric film”. This language appears to contradict what is disclosed by the figures (at least fig 1).

The language of claim 3, particularly “[and the base] has the elasticity as the elastic unit”, renders the claim unclear.

Claim 10 lacks antecedent basis for “the thin base”. It is unclear whether the claim introducing an additional base layer or referring to the original base as limited in claim 1.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5, 7, 8 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by admitted prior art [USPAT 6,043,925] to Ryu et al. (“Ryu”), which discloses a related form variable mirror element.

With regard to claim 1, fig. 2 of Ryu shows a form variable mirror element 300 comprising: a form variable part 410, including a piezoelectric film 385, a first electrode film

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395 and a second electrode film 365, which supply voltage to the piezoelectric film (col. 4 lines 34-37) and, a reflection mirror film 301 provided in the piezoelectric film 385; and a base (312 or 355), which supports the form variable part 410, wherein the form variable part 410 is provided with an elastic unit 355 which gives an elasticity to the form variable part 410.

With regard to claim 2, in addition to the rejection of claim 1 previously discussed above, fig. 2 of Ryu shows first electrode film 395 is provided on one surface (top surface) of the piezoelectric film 385 and the second electrode film 365 is provided on the other surface (bottom).

With regard to claim 3, in addition to the rejection of claim 1 previously discussed above, Ryu teaches at least the base 355 has the elasticity as the elastic unit 355 (at least col. 4 line 7).

With regard to claim 4, in addition to the rejection of claim 1 previously discussed above fig. 2 of Ryu shows an elastic sheet film is separately provided as the elastic unit 355 and the elastic sheet film is provided between the base 312 and the reflection mirror film 301.

With regard to claim 5, in addition to the rejection of claim 1 previously discussed above, fig. 2 of Ryu shows the area of the base (345 in fig. 3B) for supporting the form variable part 410 is smaller than the area of the base 312.

With regard to claim 7, in addition to the rejection of claim 1 previously discussed above, fig. 2 of Ryu shows the form variable part 410 to have a polygonal shape.

With regard to claim 8, element 410 references an array of form variable structures (col. 3 line 60), which indicates a plurality of form variable parts are provided on one base 312.

With regard to claim 14, in addition to the rejection of claim 1 previously discussed above, the collective structure of the form variable part 410 shown in fig. 2 of Ryu comprises an

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array 300 of thin film actuated mirrors 301 (col. 3 lines 58 – col. 4 line 37). Fig 2 shows the form variable mirror element formed integrally with the actuator.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryu as applied to claims 1 and 4 above, and further in view of [USPUB to 20040109236] to Nishioka, which discloses a related form variable mirror element.

With regard to claim 9, in addition to the rejection of claim 4 previously discussed above, the claimed invention has been disclosed and discussed except for the elastic sheet film to be made of resin and the Youngs' modulus of the resin is within a range of 1/100 to 1/10 of the Youngs' modulus of the piezoelectric film. Nishioka teaches an elastic sheet film to be formed from resin so as to reduce the rigidity of the device and allow large deflection at low voltages (at least ¶'s 0109 and 0147). Furthermore, Nishioka teaches that the Youngs' modulus of the elastic layer should be relatively low so as to allow large deformation at low voltages (¶0175).

Therefore, it would have been obvious at the time of the invention to one of ordinary skill in the art to ensure the form variable mirror of Ryu included these properties in order to facilitate large

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deformation of the mirror at low voltages; allowing a quick response time for the form variable mirror.

With regard to claim 10, in addition to the rejection of claim 1 previously discussed above, the claimed invention has been disclosed and discussed above except for the form variable part to have a diaphragm (disk) structure formed in an opening part of a hollow part of a base. In the sense that the form variable part is converting electrical energy into mechanical motion it constitutes a transducer or diaphragm (similar to a microphone/speaker). However, the examiner assumes that a diaphragm also includes a planar shape, as shown by applicant in the figures. The figures of Ryu only show cross-sectional views of the device, and therefore do not specifically disclose a diaphragm shape. However, fig. 12 of Nishioka shows the diaphragm disk shape of the form variable mirror, which is formed in an opening part of a hollow part of a thin base. It would have been obvious at the time of the invention to one of ordinary skill in the art to ensure that the form variable part of Ryu had a diaphragm structure as taught by Nishioka in order that the mirror element had substantial surface for reflecting or directing light.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryu as applied to claims 1 and 14 previously discussed above, and further in view of admitted prior art [USPAT 6,496,466] to Lee et al. ("Lee") and the Specification (Description of the Related Art, at least pages 3-4). The claimed invention has been disclosed and previously discussed above except for the device to be incorporated in an optical pick-up device for recording or reproducing data on an optical disk and has a unit for correcting a wave surface aberration of a laser beam. Lee teaches that micro form-variable mirrors are typically used in such applications. Furthermore, applicant admits in the Specification of the present invention that conventional

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applications of form variable mirrors include optical pickups and wave surface aberration-correcting units as claimed. Therefore, it would have been obvious at the time of the invention to use the form variable mirror element as disclosed above in recording applications as taught by Lee since such devices are conventionally used in such applications.

### ***Allowable Subject Matter***

Claims 6 and 11-13 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited prior art discloses or suggests the form variable mirror as disclosed above, wherein the reflection mirror film provided in the form variable part is extended onto the base and the reflection mirror film provided in the form variable part is formed integrally with the reflection mirror film provided in a part in which the form variable part is not disposed; and wherein the total of an internal stress of the films forming the form variable part is in a state of compressed and tensile stress and an amount of deformation of the form variable part due to the internal stress is  $1/4$  or less as long as the wavelength of light used for a PV value. These features are unique to the claimed invention and allow an extremely thin structure and large deformation under a low applied voltage.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: [USPUB 2004/0179280] to Nishioka, which discloses a related device.

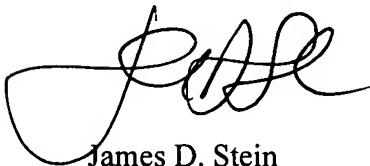
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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

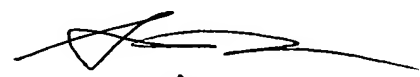
Any inquiry concerning this communication or earlier communications from the examiner should be directed to James D. Stein whose telephone number is (571) 272-2132. The examiner can normally be reached on M-F (8:00am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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